इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 14129 (1994): Flexible Packaging Materials for the Packing of Vanaspati in 10 kg and 15 kg Packs [PCD 21: Plastics Containers]

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

भारतीय मानक

10 किग्रा और 15 किग्रा के पैकों में वनस्पति की पैकिंग के लिए नम्य पैकेजबन्दी सामग्रियाँ — विशिष्टि

Indian Standard

FLEXIBLE PACKAGING MATERIALS FOR THE PACKING OF VANASPATI IN 10 kg AND 15 kg PACKS — SPECIFICATION

UDC 621·798 [678·073-416] : 664·34

© BIS 1994

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

June 1994 Price Group 4

Plastics Containers Sectional Committee, PCD 21

FOREWORD

This Insdian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Pla tics Containers Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

The Packaging of Vanaspati has been an evolutionary shift in materials ever since the implementation of IS 11352 : 1985 'Specification for flexible packs for packaging of vanaspati'.

The Standards of Weights and Measures (Packaged Commodities) Rules 1977, stipulate the packaging quantities for cooking oils, vanaspati, ghee, magarine as 100 g, 200 g, 500 g, 1 kg, 2 kg and 5 kg and thereafter in multiples of 5 kg. Flexible retail packs of size 2 kg and below have become very popular due to their lower material costs and hence have become an economic option.

5 kg, 10 kg and 15 kg vanaspati are traditionally packed in rigid plastic and tin containers respectively. Because of shortage in the availability tin plate and its high prices, an alternative to this packaging system is envisaged. Various trials have been conducted in bulk flexible packs with reasonable success. Based on the trial results, it is felt that flexible packs up to 5 kg can be marketed in the form of a direct pouch; whereas 10 kg and 15 kg packs will need a outer corrugated box as an integral part of the unit pack in order to offer satisfactory transit performance. The flexible pack may be presealed from four sides or three sides and be with or without a tubular spout and cap respectively.

The flexible material for forming the bag will have to be selected with care. It should have appropriate barrier properties to ensure adequate storage life for vanaspati without significant change from the initial quality. Further system must also have physical strength to withstand transportation. The ink used for printing of the bag/pouch shall be such that it does not leach into vanaspati.

There can hence be variation in the structure and type of flexible materials available for manufacturing the vanaspati bag. In general, the materials must ensure that the vanaspati packed remains within the accepted quality norms. The packaging material itself must also not deteriorate with the passage of time and cause failure and leakage. There is also need to offer shelf life of 90 days to cover market needs for transit, distribution and storage. Thus there is need for a detailed specification for the packaging materials, to be used in the system so as to guide the user in selecting the appropriate packaging material for his product. Performance characteristics are vital in enabling a proper choice of material, but they are time consuming and expensive. Hence, these requirements need to be correlated to certain physical properties which could be determined more regularly, easily and within a shorter time span. The tests are therefore, classified as type tests (product/type approval) and acceptance tests (product identification). The packaging material shall be subjected to product/type approval tests and then shall be tested for physical characteristics like construction, thickness, etc, which would be recorded and will be the controlling specification as long as there is no change in the packaging material.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 JULY 2003
TO
IS 14129 : 1994 FLEXIBLE PACKAGING MATERIALS FOR THE PACKING OF VANASPATI IN 10 kg AND 15 kg PACKS — SPECIFICATION

(*Foreword, para* 6) — Insert the following new paras after para 6:

'A scheme of labelling environment friendly products with the ECO logo has been introduced at the instance of the Ministry of Environment and Forests (MEF), Government of India. The ECO-Mark is being administered by the Bureau of Indian Standards (BIS) under the *BIS Act*, 1986 as per the Resolutions No. 71 dated 21 February 1991 and No. 425 dated 28 October 1992 published in the Gazette of the Government of India. For a product to be eligible for marking with the ECO logo, it shall also carry the ISI Mark of the BIS besides meeting additional environment friendly requirements. For this purpose the standard mark would be a single mark being a combination of the ISI mark and the ECO logo.

This amendment is based on the gazette Notification No. 170 dated 18 May 1996 for plastic products as environment friendly products published in the Gazette of the Government of India. This amendment is, therefore, being issued to this standard to include environment friendly requirements for flexible packaging materials for the packing of vanaspati in 10 kg and 15 kg packs.'

(*Page* 3, *clause* **5.14.2**) — Insert the following new clause after **5.14.2** and renumber the subsequent clauses:

'6 ADDITIONAL REQUIREMENTS FOR ECO-MARK

6.1 General Requirements

10.1.1 The product shall conform to the requirements for quality, safety and performance prescribed.

6.1.2 The manufacturer shall produce to BIS the consent clearance as per the provisions of *Water (Prevention & Control of Pollution) Act*, 1974 and *Air (Prevention & Control of Pollution) Act*, 1981 along with the authorization, if required under *Environment (Protection) Act*, 1986 and the Rules made thereunder while applying for the ECO-Mark. The manufacturer shall produce documentary evidence with respect to the compliance of regulation under *Prevention of Food Adulteration Act*, 1954 and *Drugs and Cosmetic Act*, 1940 and *Rules* made thereunder, wherever necessary.

6.1.3 The product must display a list of critical ingredients in descending order of quantity present expressed as percent of the total. The list of such ingredients shall be identified by Bureau of Indian Standards.

6.1.4 The product packaging shall display in brief the criteria based on which the product has been labelled as 'Environment Friendly'.

6.1.5 The material used for product packaging shall be recyclable or biodegradable.

6.1.6 It shall also suitably mention that ECO-Mark label is applicable only to the packaging material/package, if content is not separately covered under ECO-Mark. It may be stated that ECO-Mark is applicable to the product or packaging material or both.

6.2 Product Specific Requirements

For the manufacture of this product one or more of the virgin material covered in following Indian Standard shall be used:

IS No.	*Title*
10142 : 1999	Polystyrene (crystal and high impact) for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10146 : 1982	Polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10151 : 1982	Polyvinylchloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10910 : 1984	Polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11434 : 1985	Ionomers resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11704: 1986	Ethylene/acrylic acid (EAA) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12247: 1988	Nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12252: 1987	Polyalkylene terephthalates (PET & PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water

(PCD 21)

Indian Standard

FLEXIBLE PACKAGING MATERIALS FOR THE PACKING OF VANASPATI IN 10 kg AND 15 kg PACKS — SPECIFICATION

1 SCOPE

1.1 This standard covers the requirements for flexible packaging materials made of thermoplastic films or their combinations with other flexible materials for packing vanaspati in net quantities of 10 kg and 15 kg pack.

1.2 It also prescribes the requirements of corrugated box which forms an integral part of the unit pack.

2 NORMATIVE REFERENCES

The following Indian standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard indicated below:

IS No.	*Title*
1060 (Part 2) : 1960	Method of sampling and test for paper and allied products, Part 2
2508 : 1984	Low density polyethylene films (*second revision*)
2771 (Part 1) : 1990	Fibre board boxes : Part 1 Corrugated fibre board boxes (*second revision*)
2828 : 1964	Glossary of terms used in plastic industry
4006 (Part 1) : 1985	Methods of test for paper and pulp based packaging materials, Part 1
4261 : 1967	Glossary of terms relating to paper and pulp based packaging materials (with Amendments No. 1 and 2)
7019 : 1982	Glossary of terms in plastics and flexible packaging excluding paper (*first revision*)
7028 (Part 2) : 1988	Performance tests for complete, filled transport packages : Part 2 Vibration test at fixed low frequency (*first revision*)
8639 : 1977	Code for evaluation of effects of packaging on the sensory quality of foods and beverages
9845 : 1986	Methods of analysis for the determination of specific and/or overall migration of constituents of plastics materials and articles intended to come into contact with food stuffs (*first revision*)
10633 : 1986	Specification for vanaspati (*first revision*) (with Amendment No. 1)

3 TERMINOLOGY

3.1 For the purpose of this standard, definitions given in IS 2828 : 1964, IS 4261 : 1967 and IS 7019 : 1982 and the following shall apply.

3.1.1 *Type Test*

Tests carried out to prove conformity with the specification. These are intended for product/type approval of a given type of packaging materials.

3.1.2 *Acceptance Tests*

Tests carried out on sample taken from a lot passing type tests for the purpose of acceptance of the lot on a batch to batch basis.

3.1.3 *Lot*

In single consignment all the unit packs of the same type, same form and belonging to the same batch of manufacture grouped together shall constitute a lot.

4 TESTS

4.1 Classification of Tests

4.1.1 *Type Tests*

The following shall constitute type (product approval) tests (*see* Annex A):

a) Material and workmanship (*see* 5.1),
b) Thickness (*see* 5.2),
c) Vibration and storage test (*see* 5.3),
d) Overall migration (*see* 5.4),
e) Stack load test (*see* 5.5),
f) Drop test (*see* 5.6),
g) Leakage test (*see* 5.7),

h) Water Vapour Transmission Rate (WVTR) and Oxygen Transmission Rate (OTR) (*see* 5.8),

j) Heat seal strength (*see* 5.9), and

k) Flex test (Gelbo) (Optional) (*see* 5.10).

4.1.2 *Acceptance Tests*

The following shall constitute the acceptance (product identification) tests:

a) Material and workmanship (*see* 5.1),

b) Thickness (*see* 5.2),

c) Overall migration (*see* 5.4),

d) Stack load test (*see* 5.5),

e) Drop test (*see* 5.6),

f) Leakage test (*see* 5.7),

g) Ink adhesion test (for printed pouches) (*see* 5.11),

h) Product resistance of printed pouches (*see* 5.12),

j) Heat seal strength (*see* 5.9),

k) Tensile strength and elongation at break (*see* 5.13), and

m) Flex test (Gelbo) (Optional) (*see* 5.10).

4.1.2.1 The batch shall be accepted if the flexible packaging material are found to comply with requirements of acceptance/product identification tests given in 4.1.2.

5 REQUIREMENTS

5.0 The materials comprising the flexible packaging materials shall be declared and be of food grade quality conforming to relevant Indian standards on food contact plastics and shall conform to PFA Rules 1955.

5.1 Material and Workmanship

5.1.1 The flexible packaging material shall be uniform in texture and finish. It shall be free from pin holes, streaks, particles of foreign matter, wrinkles and undispersed raw materials. There shall be no visible defects such as holes, tears, or blisters. The edges shall be free from cuts, nicks and wrinkles.

5.1.2 The flexible packaging materials shall be free from any extraneous odour.

5.2 Thickness

5.2.1 The overall thickness of the pouch/bag material and the thickness of the individual layers of each ply of the flexible packaging material shall be declared by the producer in accordance with the acceptance (product identification) tests.

5.2.1.1 The overall thickness shall be within ± 10 percent of the declared value. The overall thickness shall be checked according to method given in **A-2** of IS 2508 : 1984.

5.3 Vibration and Storage Test

5.3.1 Pouches/bags made from flexible packaging material shall be tested with vanaspati to be packed into them for storage properties. The flexible packaging material shall be formed into pouches, filled and sealed as in the actual filling and sealing process of pouches. The filled pouches/bags shall be subjected to vibration test as given in Annex B.

5.3.2 The storage test shall be carried out at 38 ± 1°C and 90 ± 2 percent relative humidity (accelerated conditions) and 27 ± 1°C and 65 ± 2 percent RH (standard condition). The free fatty acid (as percentage of oleic acid), moisture content, peroxide value (PV) and rancidity of the contents as per IS 8639 : 1977 shall be noted initially and at the end of 30 and 90 days when tested under accelerated and standard conditions respectively. The flexible packaging material shall be accepted if there is no delamination, no leakage and the vanaspati does not show rancidity or increase in the values of the moisture content, free fatty acid and peroxide value above the permissible limits specified in the corresponding Indian Standards on vanaspati at the end of 30 days and 90 days under accelerated and standard conditions respectively.

5.4 Overall Migration

Representative samples of the flexible packaging material shall be subjected to Overall Migration test with *n*-heptane at 27 ± 2°C for 30 minutes, according to the method as applicable given in IS 9845-1986 with only exception that 'rectangular glass jar' as shown in the IS 9845 : 1986 may be replaced by a 500 ml glass beaker. Care must be taken that the sample is completely immersed in the solvent and does not touch the wall of the jar or beaker. The maximum extraction value of the material shall not exceed 10 mg/dm^2 and shall not exceed 60 ppm when extrapolated based on surface area and volume of contents packed.

5.5 Stack Load Test

The unit packs when subjected to a uniformly distributed stack load for 24 hours shall not show any leakage at the seam, leakage from the spout or seals area of the spout or bursting of the film. The details of stack loads and the test method are given in Annex C.

5.6 Drop Test

The filled pouches in the box for pack capacity shall be subjected to a vertical drop test at ambient condition, as detailed in Annex D.

5.7 Leakage Test

Details of the test are given in Annex E.

5.8 Water Vapour Transmission Rate (WVTR) and Oxygen Transmission Rate (OTR)

5.8.1 Flexible packaging materials corresponding to pouches passing the storage tests shall be tested for water vapour transmission rate (WVTR) according to IS 1060 (Part 2) : 1960 at 38 ± 1°C and 90 ± 2 percent RH and Oxygen Transmission Rate according to ASTM D 1424 at 27 ± 2°C and 65 ± 2 percent RH and the values obtained shall be used as controlling specifications for acceptance tests.

5.8.2 The requirements shall be fixed by the manufacturer of flexible packaging material based on **5.8.1**. Samples shall be tested on batch-wise basis and assessed on declared value.

5.9 Heat Seal Strength

5.9.1 Heat seal the flexible packaging as per actual operating conditions during its production/filling. For presealed pouches/bags all premade seals and such seals that are incorporated during filling are to be tested including seal strength of film to spout/fitment. The seals shall be tested for seal strength at break on 15 mm width in accordance to **A-4** of IS 2508 : 1984. Values obtained from pouches/bags successfully passing drop test shall be used as controlling specifications for acceptance test.

5.9.2 The requirements shall be fixed by the manufacturer of flexible packaging materials based on **5.9.1**. Samples should be tested on a batch-wise basis on the values determined above.

5.10 Flex Test (Gelbo) (Optional)

Flexible packaging materials shall be subjected to flex test as given in Annex F. These shall then be tested for WVTR and OTR (*see* **5.8**) and the values for these shall not exceed by more than 15 percent on actually determined values in **5.8**.

NOTE — This test is to be carried out only if agreed to between the purchaser and the supplier.

5.11 Ink Adhesion of Printed Flexible Packaging Material

The printed matter on the flexible packaging material when tested in accordance with the method given in Annex G, shall be still legible.

5.12 Product Resistance of Printed Flexible Packaging Materials

The printed matter on the flexible packaging material when tested in accordance with the method given in Annex H, shall be still legible.

5.13 Tensile Strength and Elongation at Break

5.13.1 Flexible packaging materials corresponding to pouches/bags successfully passing the drop test (**5.6**) shall be tested for tensile strength and elongation at break on 15 mm width according to **A-4** of IS 2508 : 1984. Values obtained shall be used as controlling specifications for acceptance tests.

5.13.2 The requirements shall be fixed by the manufacturer of flexible packaging materials based on **5.13.1**. Samples shall be tested on batch-wise basis on the values determined above.

5.14 Additional Requirements

5.14.1 In case of all pack sizes, provision of spout and fitment is optional.

5.14.2 The corrugated box shall form an integral part of the unit. The corrugated box shall be constructed as per IS 2771 (Part 1) : 1990. In addition, it shall comply with the requirements given in Table 1.

Table 1 Requirements for Corrugated Boxes

Sl No.	Characteristic	Requirement	Method of Test
i)	Material of construction	5 ply (min)	4.1 of IS 2771 (Part 1) : 1990
ii)	Water absorption test/cobb value (30 minutes) (outer face exposed), g/m, *Max*	155	6 of IS 4006 (Part 1) : 1985
iii)	Bursting Strength kg/cm^2, *Min*	10.5	6 of IS 1060 (Part 1) : 1960
iv)	Flute		
	a) Type of flute	B (Narrow)	4.2 of IS 2771 (Part 1) : 1990
	b) Direction of flute	Perpendicular to the base vertical along the stack	
	c) Compression strength	250	IS 7028 (Part 6) : 1987

6 PACKING AND MARKING

6.1 The corrugated box forming an integral part of the unit pack shall be marked with the information as required by the purchaser and the statutory requirements.

6.1.1 The inner bags (flexible bags/pouches) need not be printed. However, it shall be marked so as to identify it with the corrugated box in addition to the marking 'made from food grade plastic materials'.

6.2 BIS Certification Marking

The unit pack may also be marked with the Standard Mark. The Standard Mark on the box shall be such as not to construe as the marking on the contents of the pack.

6.2.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A

(*Clause* 4.1.1)

PROCEDURE FOR TYPE/PRODUCT APPROVAL

A-1 The pouch/bag shall be approved if it conforms with the requirements of tests given in **4.1.1**.

A-2 Accordingly, pouch/bag shall be subjected to vibration followed by storage tests. Besides, stack load test and drop test will also be carried out to prove pack integrity (leakers).

A-3 The material successfully passing these type tests shall be tested for physical characteristics like material, construction, thickness which would be recorded and these shall be the controlling specification, as long as there is no change in the initial quality of vanaspati and also the flexible packaging materials, as fixed.

A-4 In the event of any change in the initial quality of vanaspati or of the flexible packaging materials reapproval will be required and the type tests shall be carried out afresh as in **A-1** to **A-3** and the controlling specifications for acceptance test redetermined and fixed.

A-5 When the proposed changes are such that it may not be expected to significantly affect the performance (satisfactorily passing the type tests), the certifying/testing authority may at its discretion recommend waiving complete reapproval or may require only partial reapproval in order to determine the significance and acceptability of the proposed changes and to redetermine and to fix the controlling specification for acceptance tests.

A-6 If any supplier of bag/pouches/flexible packaging material wishes to obtain product/type approval for material meant for packing a type and quality of vanaspati having earlier obtained approvals for other types of materials for packing the same type and quality of vanaspati, he shall file a certificate stating that the product has successfully passed the type tests as stated in **A-1**. The certifying/testing authority may recommend waiving off these type tests or may require only partial approval tests for the purpose of determining the controlling specifications for acceptance tests.

A-7 In the event of material found to be failing one or more type tests, the testing authority may call for fresh samples not exceeding twice the number of original samples and subject them to all the test(s) or the tests in which the failure occurred. The test(s) may be considered to have been satisfied and product/type approval given only if the repeat test(s) show no failure.

ANNEX B

(*Clause* 5.3.1)

VIBRATION TEST

B-1 VIBRATION TABLE

This shall be equipment conforming IS 7028 (Part 2) : 1988.

B-2 MODE OF PACKAGING

B-2.1 The unit pack i.e flexible pouch in the box itself shall be tested.

B-3 TEST CONDITIONS

Test shall be carried out at 43 ± 1°C in a constant temperature room with the packs filled with vanaspati.

Alternately test may be carried out at ambient temperature with the packs filled with refined edible oils. In case of dispute, the ambient temperature shall be 27 ± 2°C.

B-4 PROCEDURE

Sixteen unit packs containing the product, shall be kept on the vibration table and vibrated at a peak acceleration of slightly above 1 g for 30 minutes. After the test, the pouches are examined for apparent leaks and removed. The remaining are wiped clean and placed flat on blotting paper on the vibration table at 2 Hz for 10 minutes and the bags are examined for apparent leaks and counted and added to the leakers.

B-5 CRITERIA FOR ACCEPTANCE AND RETESTING

B-5.1 The lot shall be considered passing in the test, if not more than one bag/pouch shows leakages in the test. In the event of leakage of more than one bag/pouch, a retest involving the same quantities as per **B-4** shall be taken and tested for vibration test. The lot shall be considered passing in the retest if not more than one bag/pouch shows leakage, otherwise the lot is rejected.

ANNEX C

(*Clause* 5.5)

STACK LOAD TEST

C-1 PROCEDURE

Four unit packs shall be selected from a lot of 100 packs filled in the usual way. The packs shall be subjected to a uniformly distributed load as given below for 24 h. The unit packs (i.e flexible packs placed within the box) shall be vertically placed.

The testing shall be done at 43 ± 1°C in a constant temperature room with the packs filled with vanaspati. Alternately, test may be carried out ambient temperture with the packs filled with refined edible oils. In case of dispute the ambient temperature shall be 27 ± 2°C.

The application of load shall be through a flat wooden plank which shall be placed on the unit pack in such a way that the load distribution is equal on each pack.

Pack Capacity	*Stack Load on 4 Packs* (*N*)
10 kg	1 000
15 kg	1 200

C-2 RESULT

On completion of the test, the packs shall be examined for any leakage at the seam or spout/fitment or bursting. No leakage or bursting is permitted.

ANNEX D

(*Clause* 5.6)

DROP TEST

D-1 SAMPLING

Ten filled unit packages shall be selected from a lot of one hour production or 1 000 packs filled and sealed in the usual way. The test samples are allowed to cool to 43 ± 1°C.

D-2 METHOD

Five units shall be tested first. Each shall be subjected to a flat drop on the shortest length at 43 ± 1°C on a flat hard surface. The drop height shall be 0·50 m.

D-3 CRITERIA FOR ACCEPTANCE AND RETESTING

Each flexible pouch/bag shall be examined for any leakage of the contents and delamination after the test. If none of the five bags selected for test fails in the drop test, the lot shall be considered as passing. If just one fails, the other set of five shall be tested in the same manner as above. If none fails, the lot shall be accepted otherwise the lot shall be rejected. In case of any leakage from the spout or fitment or their seals, the pack shall be rejected.

ANNEX E

(*Clause* 5.7)

LEAKAGE TEST

E-1 APPARATUS

A trough of sufficient size which when three-fourths filled with water is able to accommodate one air filled 15 kg bag/pouch fully immersed under 50 mm water.

E-2 SAMPLE

E-2.1 Ten bags shall be selected from a lot containing 1 000 bags/ pouches.

E-3 PROCEDURE

Five bags/pouches shall be filled fully with air and kept at a minimum pressure of 0·03 kg/cm^2. They shall then be immersed in the trough of water and fully submerged. Care should be taken not to create or trap bubbles under the bag.

E-4 CRITERIA FOR ACCEPTANCE AND RETESTING

Each bag shall be examined for any leakage from the spout, seals or any part of the packs as is apparent by the appearance of bubbles in the water. If none of the five leak, the lot is accepted. If one fails, another lot of five is drawn, then tested similarly. If none of the bags fails again, the lot shall be accepted. Otherwise the lot shall be rejected.

ANNEX F

(*Clause* 5.10)

FLEX DURABILITY OF FLEXIBLE PACKAGING MATERIALS

F-0 PRINCIPLE

Barrier materials are subjected to flexible action consisting of a twisting motion followed by a horizontal motion, thus, repeatedly twisting and crushing the film. Increase in gas (oxygen) permeation rate or water vapour transmission rate or both is the criterion for measuring the failure of the flexible barrier materials.

F-1 APPARATUS

F-1.1 Flex Tester

This apparatus shall consist essentially of a 90-mm diameter stationery mandrel and a 90-mm diameter movable mandrel spaced at a distance of 180 mm apart from face to face at the starting position (that is, maximum distance) of the stroke. Mandrels shall contain vents to prevent pressurization of samples. The specimen supporting shoulders on the mandrels shall be 13 mm wide. The motion of the movable mandrel is controlled by a grooved shaft to which it is attached. For the full of maximum stroke the groove is designed to give a twisting motion of 440° in the first 90 mm of the stroke of the movable mandrel, followed by a straight horizontal motion of 65 mm so that at the closed position the mandrels are 25 mm apart. The motion of the machine is reciprocal with a full cycle consisting of the forward and return strokes. The machine operates at 45 cycles per minute.

F-1.1.1 Figure 1 shows the planar evolution of the helical groove in the driven shaft to give the required 440° (37° helix angle) twisting motion and the straight horizontal motion.

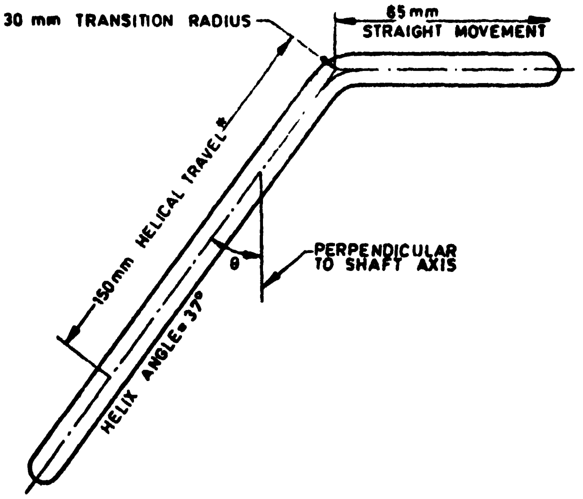

FIG. 1 PLANAR EVOLUTION OF GELBO SHAFT HELICAL GROOVE [31·8-mm (1·25-in.) DIAMETER SHAFT]

F-1.2 Tape

Flexible, double sided, pressure sensitive, not more than 13 mm wide.

F-1.3 Template

For cutting 200 mm × 280 mm samples.

F-2 TEST SPECIMENS

F.2.1 Cut the samples into 200 mm × 280 mm flat sheets with the 200 mm dimension in the direction to be tested. This will also be in the direction of the flex tester axis.

F-2.2 Flex test four specimens in their machine direction and four in their transverse direction. In addition, test a control set of four, adjacent, unflexed specimens (either direction) for WVTR and OTR.

F-2.3 Do not seal or tape the sides of the specimens, but leave them open. Use double-sided pressure sensitive tape, not more than 13 mm wide, to attach the unsealed specimen in the shape of a cylinder to the flex-tester mandrels.

F-3 CONDITIONING

F-3.1 Condition the specimens for at least 24 hours at 65 ± 5 percent relative humidity and at 27 ± 2°C temperature, unless otherwise specified as agreed upon between the purchaser and the supplier.

F-4 PROCEDURE

F-4.1 Atmospheric Conditions

Conduct flexing at the standard atmospheric conditions of 27 ± 2°C and 65 ± 5 percent relative humidity, unless otherwise specified.

F-4.2 Flex Tester Set-up

Set up the flex tester for maximum throw and twisting action. This set up gives a twisting motion of 440° in the first 90 mm of stroke, and is followed by a straight horizontal motion of 65 mm at 45 cycles per minute. With this set up, space the face of the moving mandrel at a distance of 180 mm from the face of the stationery mandrel when the moving mandrel is at its starting position. In the closest position the moving mandrel is 25 mm from the stationary mandrel.

F-4.3 Flexing

Attach the flexible barrier specimen to the flex tester mandrels, which have been lined with double sided pressure sensitive tape. Turn the flex tester on, and allow the specimen to flex for 6 minutes at 45 cycles per minute (that is, 270 cycles).

F-4.4 After flex test subject the specimen to water vapour transmission rate (WVTR) and oxygen transmission rate (OTR) (*see* **5.9**) and note the increase in values of WVTR and OTR.

ANNEX G

(*Clause* 5.11)

TEST FOR INK ADHESION OF PRINTED FLEXIBLE PACKAGING MATERIAL/BAG/POUCH

G-1 Apply two strips of 25 mm wide transparent pressure sensitive tape or cello-tape to the printed area of the pouch, one piece down the length of the pouch and the other along the width.

G-2 Press the tape firmly on to the pouch and leave for 15 seconds.

G-3 Remove the tape by pulling slowly at about 1 cm/s from one end at about 90° to the pouch surface.

G-4 There shall be no significant removal of the print from the surface of the pouch and the printed material shall be still legible.

ANNEX H

(*Clause* 5.12)

TEST FOR PRODUCT RESISTANCE OF PRINTED POUCH/BAG

H-1 Leave the pouch to stand for at least 24 hours, after printing.

H-2 Partially immerse the pouch, or representative sections cut from the printed area, in the melted vanaspati intended to be packed into the pouch at 43 ± 1°C for 1 h.

Remove the pouch or representative sections from the product and wash with cold water.

H-3 Rub each pouch or representative section firmly with paper tissue 10 times.

H-4 There shall be no significant removal of the print from the surface of the pouch and the printed material shall be still legible.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'.

This Indian Standard has been developed from Doc No.: PCD 21 (1100)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices:		Telephones
Central :	Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	331 01 31 331 13 75
Eastern :	1/14 C.I.T. Scheme VII M, V.I.P. Road, Maniktola CALCUTTA 700054	37 84 99, 37 85 61 37 86 26, 37 86 62
Northern :	SCO 445-446, Sector 35-C, CHANDIGARH 160036	53 38 43, 53 16 40 53 23 84
Southern :	C.I.T. Campus, IV Cross Road, MADRAS 600113	235 02 16, 235 04 42 235 15 19, 235 23 15
Western :	Manakalaya, E9 MIDC, Marol, Andheri (East) BOMBAY 430093	632 92 95, 632 78 58 632 78 91, 632 78 92

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. PATNA. THIRUVANANTHAPURAM.

Printed at Paragon Enterprises, Delhi, India